How apps affect on whole device performance

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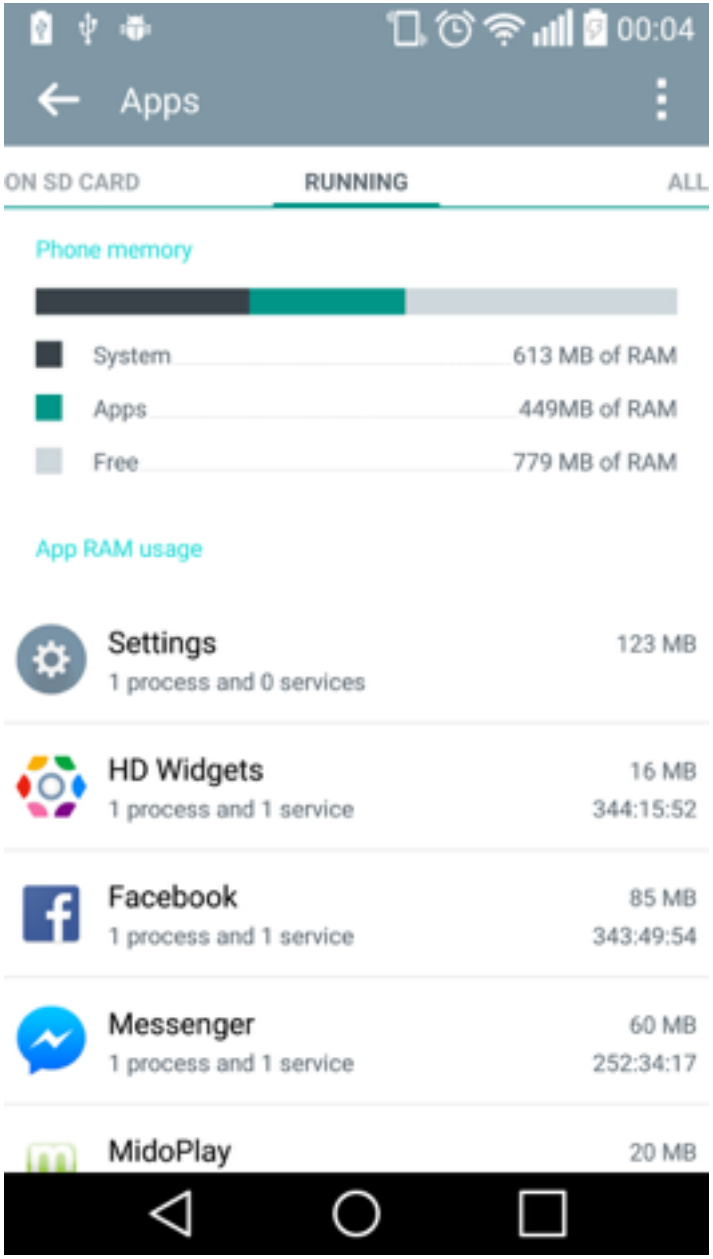
Android multitasking

- Apps are created equal
- Each app runs in its own process
- Keeps processes in (LRU) cache for faster app switching
- Process has priority

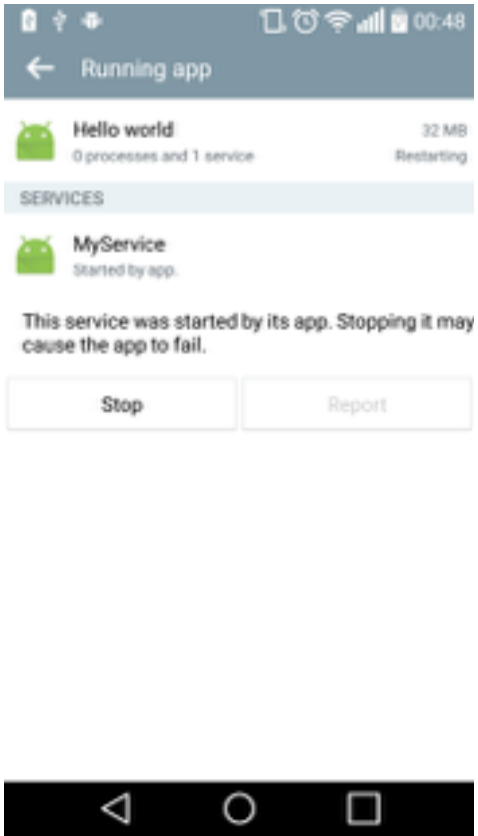

00:04
Apps
ON SD CARD
RUNNING
ALL
Phone memory
System
613 MB of RAM
Apps
449MB of RAM
Free
779 MB of RAM
App RAM usage
Settings
1 process and 0 services
123 MB
HD Widgets
1 process and 1 service
16 MB
344:15:52
Facebook
1 process and 1 service
85 MB
343:49:54
Messenger
1 process and 1 service
60 MB
252:34:17
MidoPlay
20 MB

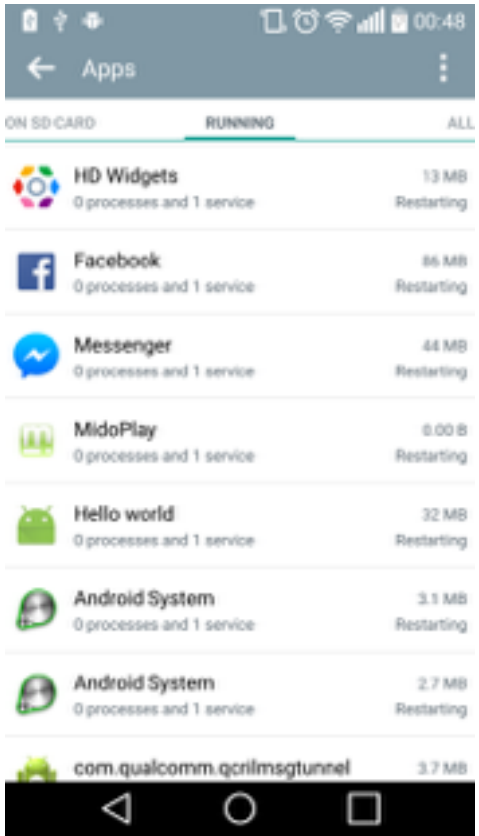
Android multitasking

- Each app affect to device overall performance
  - Memory
  - Cpu
  - Battery

Service leak

- Forget to stop when done
- Stops on low memory then restarts





Keep keeping the Device Awake

- CPU sleep to save battery
- WakeLock to keep device awake

Keep keeping the Device Awake

- Check network type for background sync

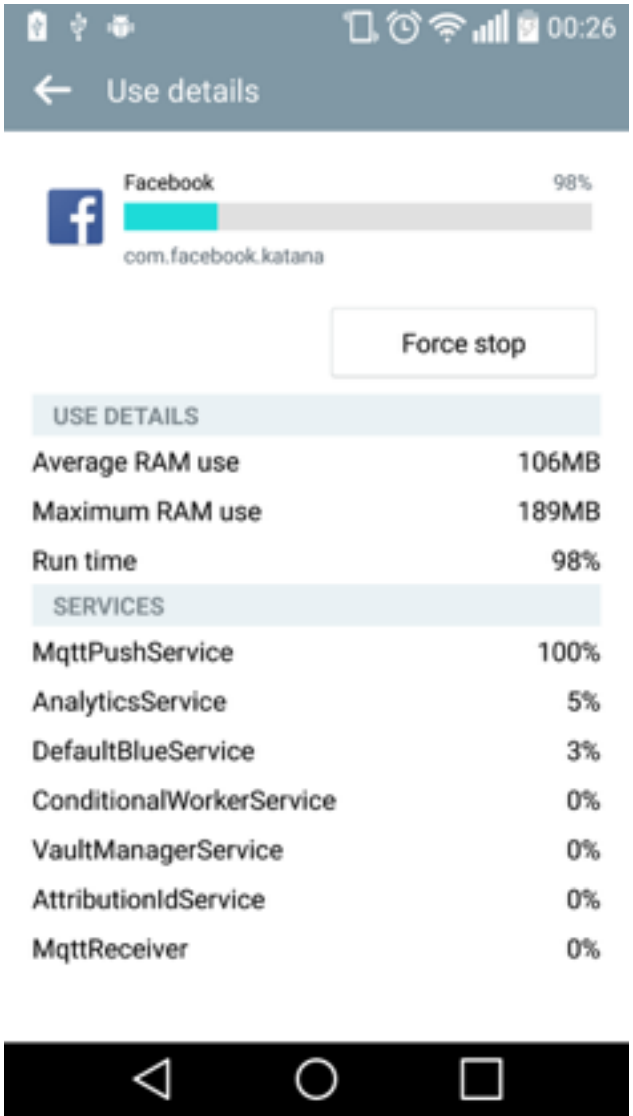
```
private static final String DEBUG_TAG = "NetworkStatusExample";
...
ConnectivityManager connMgr = (ConnectivityManager)
        getSystemService(Context.CONNECTIVITY_SERVICE);
NetworkInfo networkInfo = connMgr.getNetworkInfo(ConnectivityManager.TYPE_WIFI);
boolean isWifiConn = networkInfo.isConnected();
networkInfo = connMgr.getNetworkInfo(ConnectivityManager.TYPE_MOBILE);
boolean isMobileConn = networkInfo.isConnected();
Log.d(DEBUG_TAG, "Wifi connected: " + isWifiConn);
Log.d(DEBUG_TAG, "Mobile connected: " + isMobileConn);
```

- Request timeout
- Considering batch operations

Release memory when not use

- onTrimMemory()
- Use muti-processes

Release memory when not use



Foreground operations in the background

- Scheduling policy:
  - Thread/process priority
  - cgroups

Be careful about using external libraries

- https://developer.android.com/training/best-performance.html
- https://developer.android.com/training/best-background.html
- https://developer.android.com/training/building-connectivity.html
- http://stackoverflow.com/questions/7931032/android-process-scheduling
- http://android-developers.blogspot.com/2010/04/multitasking-android-way.html

- http://developer.android.com/tools/help/monitor.html
- http://developer.android.com/tools/debugging/debugging-tracing.html
- http://developer.android.com/tools/help/systrace.html
- http://developer.android.com/tools/performance/index.html